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Green's function expansions in dyadic root functions for shielded layered waveguides

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Abstract

Dyadic Green's functions for inhomogeneous parallel-plate waveguides are considered. The usual residue series form of the Green's function is examined in the case of modal degeneracies, where secondorder poles are encountered. The corresponding second-order residue contributions are properly interpreted as representing "associated functions" of the structure by constructing a new dyadic root function representation of the Hertzian potential Green's dyadic. The dyadic root functions include both eigenfunctions (corresponding to first-order residues) and associated functions, analogous to the idea of Jordan chains in finite-dimensional spaces. Numerical results are presented for the case of a two-layer parallel-plate waveguide.

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